What's New in Pediatrics

Paroxysmal Tachycardia in Infancy

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PAROXYSMAL tachycardia is rare in infants, although it is seen more frequently than it is recognized. It is important to the physician called upon to treat infants because it may be the cause of symptoms generally associated with a wide variety of other diseases, including diarrhea, pneumonia, and "idiopathic" cardiac enlargement. The symptom complex presented may lead to wrong diagnosis if the heart rate is not carefully counted. Paroxysmal tachycardia is important, too, as a possible cause of death, otherwise unexplainable, although it certainly does not underlie all or perhaps even the majority of unexplained and sudden deaths in infancy. Lastly, it is important because if the proper treatment is given, the response is uniformly satisfactory. Unless there is some associated and underlying disease which might of itself prove fatal, a situation which is not usual in such cases, treatment may well be life-saving.

In many instances the paroxysm will terminate spontaneously, without treatment, but as the condition is potentially dangerous, there is need for recognition and prompt treatment.

Review of the literature and solicitation of several hospitals and physicians in the Los Angeles area has yielded reports of about 100 cases of paroxysmal tachycardia in infancy. Less than 10 per cent of the patients had associated congenital heart disease. In almost 20 per cent of the cases the patient died, and although paroxysmal tachycardia with heart failure was not the true cause of death in all instances, still, some of these deaths might have been prevented.

DIAGNOSIS

As in many unusual conditions, diagnosis is based on a high index of suspicion and on careful examination, including accurate determination of the heart rate. Since infants cannot describe the palpitation that characterizes this condition in adults and directs attention toward the heart, the diagnosis is made from signs. The most common of these is failure to eat properly. Fretfulness and wakefulness may be noted, or the baby may be listless and drowsy. This may go on for several hours or days. Vomiting, or occasionally diarrhea, is present. Slight fever is usual, and leukocytosis is often noted. As the condition persists, signs of shock and of congestive heart failure appear, with dyspnea, tachypnea, cyanosis, hepatomegaly, cold clammy sweat, stupor, and, rarely, convulsions. The heart may be somewhat enlarged and there may be pulmonary congestion or pleural effusion. Auscultation will reveal very rapid heart action, often described as "too rapid to count," but careful study will permit accurate determination of the rate at least as fast as 250 per minute. It is rarely that the rate is slower than this in supraventricular tachycardia in infants, and in this respect it differs from paroxysmal tachycardia in adults, in whom the rate is usually between 150 and 250 beats per minute, often less than 200. Hubbard,[1] in 1943, reported one case of paroxysmal tachycardia in an infant with heart rate (proven electrocardiographically) of 353 per minute. The normal heart rate in infants is usually between 120 and 160. Sinus tachycardia at 200 beats per minute is not unusual, but paroxysmal tachycardia should be suspected if the rate is over 200 per minute and particularly if it is over 250 per minute.

Diagnosis is established by the electrocardiogram. This characteristically shows supraventricular tachycardia. Further definition as to auricular flutter or AV-nodal tachycardia is often impossible. Ventricular tachycardia is extremely rare in infancy, particularly in the first year of life. In the series reviewed it occurred in only five of 100 cases, and in four of these the diagnosis appeared questionable. If it is impossible to obtain an electrocardiogram to prove the diagnosis and the condition of the infant appears serious, it would seem reasonable and in the best interest of the patient to assume that a heart rate of 250 per minute or faster might be due to paroxysmal supraventricular tachycardia and to proceed with treatment based on this assumption.

TREATMENT

Digitalis is indicated. Many preparations are available, but it appears that lanatoside-C is the drug of choice. It is given intravenously (eliminating the uncertainties of absorption inherent in oral and subcutaneous administration), the dose can be accurately determined, and it has a wide margin of safety and is well tolerated.

No rigid criteria have been established for determining the proper dose, and various opinions have been expressed as to the tolerance and requirements of infants as compared to adults. A practical approach, and one that has proved satisfactory, approximates the application of Clark's rule, with

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dosage based on the weight of the infant. One-hundredth milligram of the drug per pound of body weight may be given intravenously as the initial dose. After ten minutes each carotid sinus may be massaged. This is occasionally effective after lanatoside-C has been given, but not before. If the heart action has not become normal in 15 minutes, the same dose should be repeated. This is usually effective within 20 minutes. If paroxysmal tachycardia persists, one-half of this dose may be given after 30 minutes have elapsed, and may have to be repeated after another 30 minutes. Caution must be used not to overwhelm the infant with too much of this potent drug, lest the treatment itself prove fatal.

Rarely, lanatoside-C may not be effective, and in this unusual situation more dangerous drugs should be considered. In one such case, ouabain proved life-saving. The dose of this drug may also be calculated according to Clark's rule. Various other drugs have been tried, and there are several reports of the successful use of mecholyl, but the administration in each instance appears to have precipitated alarming and hazardous reactions, and even death.

L. T. Bullock, M.D., and H. Rollman, M.D., gave the author permission to summarize, for this presentation, certain data which will appear in greater detail in a forthcoming article, which will include a complete bibliography.

PROPHYLAXIS

Once an attack has been terminated, the question of prophylaxis must be settled. Frequently there is no recurrence, and no prophylaxis is needed. Sometimes recurrences are so widely spaced that the value of prophylactic drug administration is questionable as it may seem more satisfactory to treat each attack on appearance. If the arrhythmia appears twice within a week or less, however, prophylactic administration of some potent digitalis preparation appears warranted, with the objective of maintaining full digitalization. The daily maintenance dose is approximately 10 per cent of the digitalizing dose. Daily administration of 20 mg., or slightly more, of digitalis leaf or its equivalent of tincture of digitalis is usually satisfactory. The same precautions regarding possible toxic effects are required in treating infants as in older individuals, and constant supervision is essential. Once prophylaxis is started it should be continued for at least a month and perhaps longer.

REFERENCE

1. Hubbard, J. P., and Starbuck, G. W.: Paroxysmal tachycardia in a two months old infant with a ventricular rate of 350, Am. Dis. Child., 65:582, April 1943.